In the Claims:

The following listing of the claims replaces all previous versions and listings of the claims.

1.   (Original) A non-invasive *in vivo* method for assessing carotenoids in the retina and/or macula, comprising:

performing Optical Coherence Tomography (OCT) on a retina of a subject; and

generating a spatial representation of carotenoid levels in the retina based on data from the OCT of the retina.

2.   (Original) A method according to Claim 1, wherein the performing step comprises transmitting a blue excitation light to the retina.

3.   (Original) A method according to Claim 1, wherein the performing step comprises transmitting an excitation light comprising a blue excitation light and an infrared excitation light.

4.   (Original) A method according to Claim 1, wherein the generating step comprises applying a wavelet transformation to an OCT signal to generate spectral data of the retina.

5.   (Original) A method according to Claim 1, wherein the performing step comprises transmitting a low coherence light with a superluminescent diode.

6.   (Original) A method according to Claim 1, wherein the performing step comprises obtaining an absorption and/or reflectance spectrum of the retina and identifying levels of carotenoids therein in response to the absorption and/or reflectance spectrum.

7.   (Original) A method according to Claim 1, wherein the generating step comprises repeating the performing and generating steps after administration of a selected treatment to provide a first and second spatial representation of carotenoid levels in the retina.

8.   (Original) A method according to Claim 7, further comprising comparing the first spatial representation with the second spatial representation and evaluating the efficacy of the selected treatment on age related macular degeneration (AMD) based on the comparing step.

9.   (Original) A method according to Claim 1, wherein the carotenoids include at least one of β-carotene, lutein, lycopene, xanthophyl, xanthophyll, and/or zeaxanthin.

10.   (Original) A method according to Claim 1, wherein carotenoids of interest have a chemical structure having at least one alternating double carbon-carbon bonds and/or single carbon-carbon bonds.

11.   (Original) A method according to Claim 1, wherein the generating step includes comparing a detected light spectrum from the OCT to *a priori* reference spectra corresponding a plurality of different known concentrations of the carotenoids.

12.   (Original) A method according to Claim 1, wherein the generating step is able to determine a retinoid concentration level in the retina.

13.   (Original) A method according to Claim 1, further comprising detecting a resonant Raman spectra based on the OCT data.

14.   (Original) A method according to Claim 1, wherein the performing step comprises:
    scanning the retina with low coherence light of an OCT scanner;
    detecting reemitted light from the retina in response thereto;
    interfering the detected light from the retina with a reference light beam to provide an interference signal; and
    obtaining a light spectrum from the interference signal.

15.   (Original) A method according to Claim 1, wherein the performing step comprises detecting reflectance and/or absorption spectra of different layers of the retina.

16.   (Original) A method according to Claim 15, wherein the different layers includes at least seven layers.

17.   (Original) A method according to Claim 1, wherein the generating step comprises generating a two-dimensional map of carotenoid levels in a cross-sectional spatial representation of the retina from the OCT.

18.   (Original) A method according to Claim 1, wherein the generating step comprises generating a three-dimensional morphology map of carotenoid levels in the retina.

19.   (Original) A method according to Claim 1, wherein the spatial representation comprises a map of a plurality of adjacent layers of the retina and covers a region about 2-5 mm wide.

20.   (Original) A method according to Claim 1, wherein the spatial representation comprises at least about 1000 data pixels.

21.   (Original) A method according to Claim 1, wherein the generating step comprises generating an intensity graduated and/or color indexed image of different levels of carotenoids in the retina.

22.   (Original) A method according to Claim 1, further comprising assessing age-related macular degeneration (AMD) based on the spatial representation of the carotenoid levels.

23.   (Original) A method according to Claim 1, further comprising:
        illuminating a portion of the retina with an optical excitation beam having a wavelength selected to generate a resonant Raman spectrum of at least one of the carotenoids;

detecting a resonant Raman spectrum corresponding to the selected illuminated region of the eye; and

combining resonant Raman spectrum data with OCT data to generate the spatial representation of carotenoid levels in the retina.

24. (Original) A method according to Claim 23, wherein the generating and illuminating steps are performed substantially simultaneously.

25. (Original) A method according to Claim 24, wherein the generating step further comprises detecting an OCT signal, the method further comprising filtering the resonant Raman spectrum from the OCT signal.

26. (Original) A method according to Claim 1, wherein the performing step comprising performing OCT on the macular portion of the retina.

27.-50. (Canceled).

51. (New) A method according to Claim 1, wherein the performing step comprises transmitting a low coherence light to a portion of the retina.